

Claims

1. A method of guiding a catheter or the like along a blood vessel by monitoring the advance of the catheter and correcting any deviation preventing the advance of the catheter tip by partially withdrawing and rotating the catheter in order to return the catheter tip to a position enabling its 5 advance along the blood vessel, characterized in that the advance of the catheter is monitored by detecting any inversion of the position of the catheter tip with respect to its advance along the blood vessel and that the catheter tip is returned to a position enabling its advance when an inversion of its position is detected.
2. A method of guiding a catheter according to claim 1, characterized by:
 - 10 (a) generating monitoring signals related to the cardiac activity and delivered successively during the advance of the catheter along a blood vessel of a patient by at least one mobile sensor arranged on the catheter;
 - (b) comparing said monitoring signals with a reference during the advance of the catheter;
 - (c) enabling the advance of the catheter when said signals correspond to said reference;
- 15 (d) interrupting the advance of the catheter when said monitoring signals deviate from said reference in order to return the catheter tip to a position enabling the advance of the catheter.
3. A method according to claim 2 characterized by using a bipolar electrode to obtain monitoring signals corresponding either to a reference voltage to enable the advance of the catheter or to a second voltage to interrupt its advance.
- 20 4. A method of catheterization comprising guiding a catheter or the like along a blood vessel by monitoring the advance of the catheter and correcting any deviation preventing the advance of the catheter tip by partially withdrawing and rotating the catheter in order to return the catheter tip to a position enabling its advance along the blood vessel, characterized by:
 - (a) generating monitoring signals related to the cardiac activity and delivered successively during 25 the advance of the catheter along a blood vessel of a patient by at least one mobile sensor arranged on the catheter, said mobile sensor being adapted to successively deliver cardiac signals that correspond to impulses associated with the cardiac activity and represent an internal an internal cardiogram of a patient undergoing catheterization.
 - (b) comparing said monitoring signals with a reference during the advance of the catheter;
 - 30 (c) enabling the advance of the catheter when said signals correspond to said reference;
 - (d) interrupting the advance of the catheter when said monitoring signals deviate from said reference in order to return the catheter tip to a position enabling the advance of the catheter.
5. The method according to claim 4 characterized by verifying the position of the catheter tip in contact with the wall of the heart cavity by creating impulses at the tip of the catheter and detecting 35 the appearance of corresponding induced signals on a surface cardiogram of the patient.

6 The method according to claim 5, characterized by verifying the entry of the catheter tip into the heart atrium of the patient undergoing catheterization by detecting a significant increase in the amplitude of cardiac signals corresponding to the atrial impulses and appearing on said internal cardiogram of the patient.

5 7. The method according to claim 6, characterized by verifying the passage of the catheter tip from the atrium to the ventricle of the patient undergoing catheterization by detecting a significant increase in the amplitude of the cardiac signals corresponding to ventricular impulses and appearing on said internal cardiogram of the patient.

8. Catheterization system for carrying out the method according to claim 4, characterized by:

- 10 (a) a catheter provided with at least one mobile sensor adapted to deliver cardiac signals associated with the cardiac activity and transmitted along a blood vessel of a patient;
- (b) an electronic unit comprising a central processor connected to said mobile sensor via a filter, an analog-to-digital converter and a signal processor and adapted to compare said cardiac signals and to deliver a GO signal, a STOP signal and an END signal to respectively enable, interrupt or terminate
15 the advance of the catheter.

9. The catheterization system according to claim 8, characterized by a device for obtaining a surface cardiogram of the patient undergoing catheterization, said device being connected to said central processor via a second filter, a second analog-to-digital converter and a second signal processor.

20 10. The catheterization system according to claim 8, characterized by a mobile sensor comprising a bipolar electrode adapted to deliver said cardiac signals and to generate impulses in the heart cavity of the patient undergoing catheterization.

11. The catheterization system according to claim 8, characterized by a catheter provided with one or more types of mobile sensors selected from the group including a bipolar electrode, a flow sensor,
25 a pressure sensor, a deflection sensor and an ultrasonic sensor.